

# **OPERATIONS AND MAINTENANCE MANUAL WINCH OPERATORS PANEL AMS4A141**

## **TABLE OF CONTENTS**

<b>SECTION</b>	<b>DESCRIPTION</b>
<b>1.0</b>	<b>GENERAL DESCRIPTION</b>
<b>2.0</b>	<b>DETAILED DESCRIPTION OF FEATURES</b>
<b>3.0</b>	<b>MENU OPERATING INSTRUCTIONS OPEN HOLE MODE</b>
<b>4.0</b>	<b>SYSTEM OPERATING INSTRUCTIONS</b>
<b>5.0</b>	<b>SPARE PARTS LIST</b>
<b>6.0</b>	<b>DRAWINGS AND SETUP PROCEDURES</b>
<b>7.0</b>	<b>INSTALLING NEW SOFTWARE</b>
<b>8.0</b>	<b>CABLE DRAWINGS</b>

## 1.0 INTRODUCTION

### 1.1 GENERAL DESCRIPTION

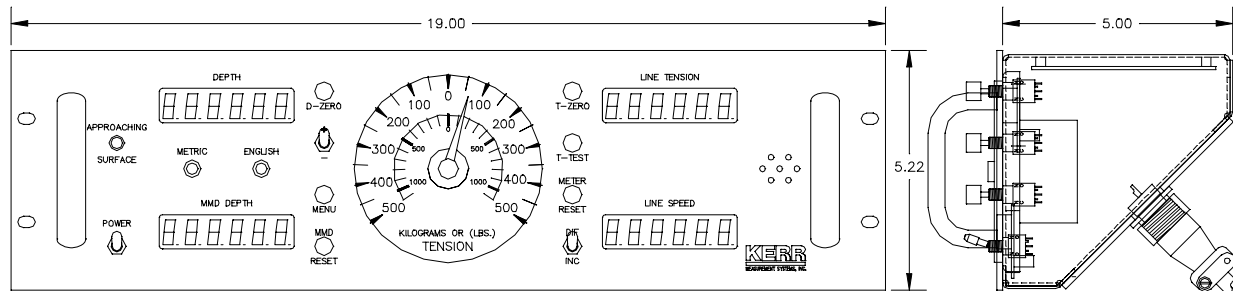
The BenchMark AMS4A141 panel is designed to acquire and display depth, tension, and CCL or magnetic mark data from a wireline winch unit. The panel provides the operator a means to set and make adjustments to the data as necessary.

Depth is displayed from data provided from an encoder mounted on a measuring device. The encoder quadrature pulses are output to the acquisition system. The tension data is provided by a load pin and is also output to the acquisition system.

The encoder quadrature pulses, tension data, and magnetic marks are passed through to the acquisition system. The output connectors are compatible with the SDS Warrior system.



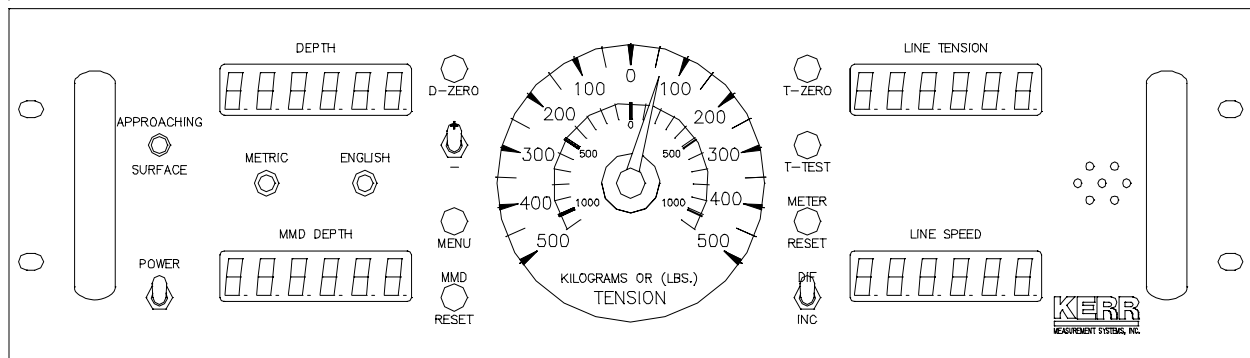
## 1.2 FEATURES AND SPECIFICATIONS



- Digital displays for depth, line speed, tension and magnetic marks, CCL depth offset, or last detected collar depth.
- Analog incremental tension meter, 4 inch (108 mm) dia., 270 degree
- Differential or Incremental tension zero push button switch
- Excessive tension alarm setting allows operator to set tension alarm to a predetermined value. Contact closure is provided for winch shutdown
- Zero Depth button - sets depth to 0. Depressing button again resets depth to previous setting. Only works when line speed is zero
- Approaching surface alarm
- Depth adjust up or down switches. Only works when winch is stopped
- Load cell zero & calibrate controls. Only works when there is no load on cable
- Depth & tension saved in non-volatile memory at power loss
- Outputs for Magnetic Marks, Tension and Encoder to interface to an acquisition system. Outputs are compatible with SDS Warrior.
- RS232 Interface for additional control and data outputs.
- Can be set to display either English or Metric units or a combination of English and Metric units (i.e. depth in feet, tension in KG).
- Panel is powered by 12-24vdc. All sensor power (encoder, load pin, MMD, etc) is provided by the panel. No other power supplies are needed.

## 2.0 DETAILED DESCRIPTION OF FEATURES

### 2.1 FRONT PANEL



#### 2.1.1 ANALOG TENSION METER

This meter displays either differential or incremental tension. This provides a more visual display of tension change.

#### 2.1.2 INCREMENTAL/TOTAL TENSION SWITCH

This switch will change the analog meter from Incremental tension to Differential tension.

Incremental tension provides a high resolution tension scale. It must be periodically reset as tension increases or decreases to keep it from pegging out.

Differential tension provides a delta tension reading. The meter will slowly reset itself to 0 so the reset switch is not necessary.

#### 2.1.3 METER RESET SWITCH

This switch will reset the meter to the 0 (center) position.

#### 2.1.4 DEPTH DISPLAY

This meter provides a digital display of depth.

#### 2.1.5 LINE TENSION DISPLAY

This meter provides a digital display of total line tension.

#### 2.1.6 LINE SPEED DISPLAY

This meter provides a digital display of line speed.

#### 2.1.7 MAGNETIC MARK / CCL DISPLAY

This meter provides a digital display of the depth where the last mark was detected. It can also be used as a CCL offset display or the depth of the last Collar detected.

#### 2.1.8 MAGNETIC MARK RESET

Pressing the MMD reset button clears the last mark setting. The next mark detected will be used to set the window for any subsequent marks.

#### 2.1.9 ZERO DEPTH

Pressing this button will reset the depth to 0. Depressing the button again will reset the depth to the previous setting. The Zero Depth button will only work when the line speed is zero (i.e. winch not moving).

#### 2.1.10 MENU

Pressing this button will activate the menu software. The software feature to be set will be displayed on the DEPTH display. The features can be toggled through by pressing the menu button until the desired feature is displayed.

#### 2.1.11 + / - SWITCH

This switch is used for different functions. It is used to change the depth setting in either an up or down direction. The winch must be stopped before the depth can be set. In menu mode (see section 3.0) the switch is used to set menu parameters.

#### 2.1.12 APPROACHING SURFACE LED AND ALARM

This LED is lit and an audible alarm is sounded when the depth is less than 100' (30 m). This is a warning to the hoist operator that they are approaching surface and should take care to get the equipment safely out of the well. When the LED is depressed, the alarm will stop but the LED will continue to blink. Once the depth

reading is greater than 100' (30 m), both the alarm and the LED will turn off.

### 2.1.13 ENGLISH / METRIC UNITS

These LEDs will indicate if the panel is in English or metric mode. If the depth is set to English, the English LED will be lit. If the depth is set to Metric the Metric LED will be lit. The tension can be set to English (LBS) or Metric (KG) but it will not light the LED.

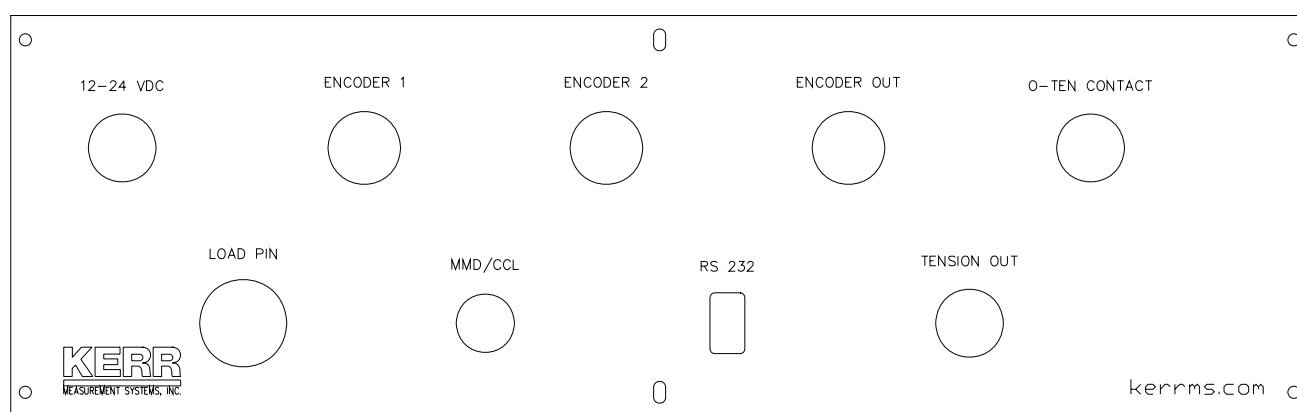
### 2.1.14 T-ZERO SWITCH

Use this switch to set the tension to 0 at the start of a logging run. This will zero out the tension circuit. The line should be slack through the head at this time.

### 2.1.15 T-TEST SWITCH

Press T-TEST and verify that the panel tension reads 20000 lbs (MODE 5) or 5000 lbs (MODE 3). Verify tension is being properly recorded on acquisition system.

## 2.2 REAR PANEL



### 2.2.1 POWER INPUT

This connector supplies dc power for the panel operation (9 VDC min, 30 VDC max). The panel can operate on either 12 or 24 vdc (12 vdc is U.S. truck standard voltage, 24vdc is European truck standard voltage). Pin A is positive, pin B is negative.

### 2.2.2 ENCODER 1, ENCODER 2,

+5 vdc power is provided to the encoders and signal is received from the encoders on these connectors. Refer to the section 6.0 for the pinout listing..

Note: encoders can be either differential quadrature (A, B, A/, B/ or single quadrature (A, B).

### 2.2.3 ENCODER OUT

This connector provides an encoder quadrature data output. This data can be used to provide depth data to the acquisition system. The output PPF data is selectable. No encoder power is provided.

### 2.2.4 OVER TENSION CONTACT

This connector provides a connection to the overtension circuit relay. When an overtension condition is active, the two pins are connected together. In normal position the two pins are open. This feature can be used to interface to the winch unit control system to provide automatic hoist shutdown when an overtension condition is reached.

### 2.2.5 LOAD PIN

+/- 15vdc power is provided to the load pin and signal is received from the load pin on this connector. Refer to the section 6.0 for the pinout listing..

### 2.2.6 MMD / CCL

+ 15vdc power is provided to the magnetic mark detector and signal is received from the mark detector on this connector. Refer to the section 6.0 for the pinout listing..

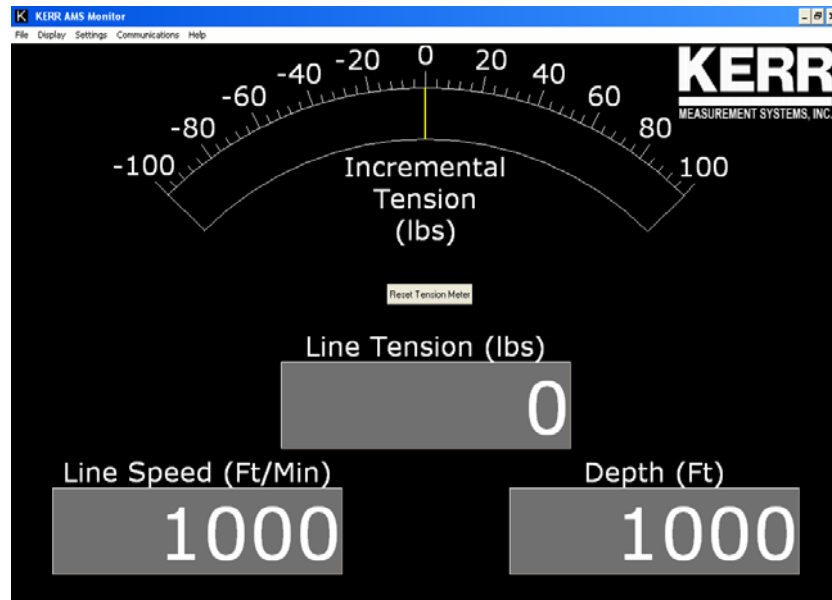
### 2.2.7 TENSION OUT

This connector provides a 4-20ma tension data output to the acquisition system. The output is provided on pins C and D.  
4 ma = 0 lbs, 20 ma = 12,500 lbs

### 2.2.8 RS232 SERIAL INTERFACE

A PC can be used to display depth, tension, and line speed data from the panel. The PC can also be used to set panel parameters.

A program is available from BenchMark Wireline Products to display this data (see figure below).



To connect the panel to a computer, connect a serial cable from the PC to J6 on the rear of the panel.



### 3.0 MENU COMMANDS

This panel has internal software which allows it to be set for various configurations. To change the settings, press the MENU button. The feature to be set will be displayed on the DEPTH display. Press the MENU button again until the feature you want to set is displayed.

The parameters for each feature will be displayed on the LINE TENSION display. Press the +/- switch to cycle through all the available parameters. When the value you want to select is displayed, press the MENU button. ACCEPT will then be displayed. Press + for yes, - for no.

Following is a listing of all the available settings.

Note: These options are for the AM3K measuring head. The software can also be configured for an AM5K measuring head by removing the jumper on JP3.

#### 3.1 TEN ALARM

When preset tension value is reached, alarm sounds and tension display flashes value

Procedure: Use +/- switch to set the tension alarm setting.

Indication: TALARM will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Selection: Each cable size will have a corresponding Tension Alarm setting. Only the setting for the cable size selected (see menu option 1) can be adjusted.

##### Default Values

7-32	1500
9-32	2400
5-16	2400
3-8	2400
7-16	2400
15-32	2400
15-32HT	2400
SLAM	2400
SLAMHT	2400
S-SLAM	2400

## S-SLAMHT 2400

### 3.2 DELTA TENSION ALARM

When the delta tension setting is reached the alarm sounds. In incremental mode, you must periodically press meter reset or this alarm will sound when the tension reaches the set value. In differential mode, the meter will reset itself and the alarm will only sound on a quick change of tension. The Alarm Reset switch must be pressed to reset the over tension relay.

Procedure: Use +/- switch to set the Delta Tension setting.

Indication: **DTALRM** will be displayed on the DEPTH display and the value being set will be displayed on the TENSION display as it is being adjusted.

### 3.3 TENSION SHUTDOWN

When value is reached, alarm sounds, tension display flashes value, and tension contact closure switch is closed. This can be used to provide a signal to automatically stop the winch.

Procedure: Use +/- switch to set tension shutdown setting

Indication: **OVRTEN** will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

Selection: Each cable size will have a corresponding Tension Alarm setting. Only the setting for the cable size selected can be adjusted.

#### Default Values

7-32	2000
9-32	3000
5-16	3500
3-8	3500
7-16	3500
15-32	3500
15-32HT	3500
SLAM	3500
SLAMHT	3500
S-SLAM	3500
S-SLAMHT	3500

### 3.4 CABLE SIZE

Cable size selection automatically sets load pin angle setting for the selected cable size.

In mode 3, wheel size is also automatically set for the selected cable size.

If other is selected, the LCA value needs to be entered. This value is based on the bend angle of the cable over the tension wheel. This value is empirically derived and must be furnished by the measuring head manufacturer.

Procedure: Use +/- switch to select cable size.

Indication: CABLE will be displayed on the DEPTH display and the selections will be displayed on the LINE TENSION display.

#### Cable Size Values available

7-32

9-32

5-16

3-8

7-16

15-32

15-32HT **USE THIS SETTING W/ DEEP GROOVED WHEEL**

SLAM

SLAMHT

S-SLAM

S-SLAMHT

OTHER

Default value is SLAM

#### HT – HIGH TENSION WHEEL SETTINGS

The HT designates the High Tension or grooved tension wheel when installed on the AM5K measuring head (refer to AM5K measuring head user manual). This wheel is used for high tension operations or with cable requiring less bend. It can only be used with 15-32 or large cables.

When this wheel is installed, you must select one of the cable sizes with the HT designator.

The other tension wheel available on the AM5K measuring head is a flat wheel. This wheel will work with all sizes of cables.

## OTHER

If you select the "OTHER" setting, you will be allowed to change the measuring wheel circumference and the load cell factor. This allows the panel to with a different type of measuring head or a different load cell, such as a derrick mounted load cell.

When "OTHER" is selected, two additional inputs will be required:

LCFACTOR and WHLCIR.

LCFACT (Load Cell Factor). This setting determines the ratio between the input signal and the tension value displayed. A setting of 2 will decrease the tension value by  $\frac{1}{2}$ . A setting of .5 will double the tension reading.

Default value is 1.

WHLCIR (Wheel Circumference). This value is set to the circumference of the measuring wheel to ensure the depth is measured correctly. Default value is 2.0 ft.

## 3.5 DEPTH ADJUST (Shim)

The shim amount selected will automatically be added or subtracted from the depth input.

Procedure: Use +/- switch to set the shim setting.

Indication: DP-ADJ will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set. The values are feet / thousand.  
Default value is 0.

## 3.6 DEPTH ALARM

When Alarm depth value is reached, the alarm will sound and LED will flash. Pressing the LED will turn off alarm but the light will continue to flash.

Procedure: Use +/- switch to set the depth alarm value.

Indication: DALARM will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set. Default value is 100'

### **3.7 MMD or CCL**

Either MMD or CCL can be selected. MMD provides a the ability to detect magnetic marks. CCL provides a means to display the offset between the CCL depth and the bull plug depth.

Procedure: Use +/- switch to select either MMD or CCL.

#### **3.7.1 CCL**

The CCL depth will be displayed on the MMD meter. This makes it easier to monitor CCL depth in addition to bottom of tool depth. The following menu options are available.

##### **CCL OFFSET**

The CCL depth will be displayed on the MMD meter. This makes it easier to monitor CCL depth in addition to bottom of tool depth.

Procedure: Use +/- switch to set the CCL offset depth

Indication: CCL will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

##### **OFFSET**

Use +/- switch to set the CCL offset depth

##### **LOG**

The following menu options are available:

##### **LOG CCL**

Displays latest 100 collars. Will overwrite the oldest collar after 100.

##### **CCL DLY**

Use +/- switch to set delay from 1.0 to -0.1 Adds or subtracts to detected collar depth.

##### **CCL\_BP**

Turns detected CCL audio on or off.

##### **STRCOR (stretch correction)**

Use +/- switch to toggle between ON or OFF

When STRETCH Correction is on, the panel will automatically correct depth to compensate for cable stretch. The following information will then be requested:

#### TOOLWT

The weight of the tool string at the end of the cable. Default value is 1000 lbs.

#### FLUIDW

The fluid weight of the well bore fluids. Default value is 8.3 lbs.

Stretch in the wireline is compensated in the following manner:

As the tool is lowered into the well the depth traveled is measured using the optical encoders 10 times a second. The tension is used to “back out” the stretch on the wireline for that segment and a non stretched depth is calculated by keeping a tally of all of the segments. This summed value is used in the following manner to calculate the depth:

If the tension is less than the calculated line weight the tool is assumed to be floating or supported in some other manner. The tension is due to the line weight so the stretch added is = summed depth \* tension \* Ks \* 1/2 where Ks is the stretch coefficient. If the tension is greater than the line weight the stretch due to the line weight is calculated as above and all other weight is assumed to be acting over the entire length of the cable or = sum depth \* ((line weight \* 1/2) + (tension-line weight)) \* Ks

#### CCL LOG

Press the +/- switch and you will be able to see the depth at which each casing collar was detected. The MMD/CCL display will display the depth of each collar when the switch is pressed.

### 3.7.2 MMD

The following menu options are available.

#### MMDCOR (MMD Correction)

Use +/- switch to toggle between ON or OFF

If MMD is set to ON the panel will automatically correct depth to correspond to magnetic mark spacing. When depth is automatically added or subtracted it will be done evenly at a rate of 1' per 10'.

#### STR CORR (Stretch Correction)

Stretch Correction works differently depending if MMD correction is ON or OFF.

If MMD Correction is ON and STRCORR is ON, the panel will automatically correct the MMD WINDOW depth to compensate for cable stretch. The Mark Window will change as the cable stretches to make sure the window is always set properly.

STRCORR can be turned off by selecting OFF. No stretch will be added in this case.

If MMD Correction is OFF or STRCORR is off, no stretch will be calculated.

If STRCORR is turned ON, the following information will be requested:

##### TOOLWT

The weight of the tool string at the end of the cable.  
Default value is 1000 lbs.

##### FLUIDW

The fluid weight of the well bore fluids.  
Default value is 8.3 lbs.

#### SPACNG

This is to set the spacing at which the magnetic marks were installed on the wireline.

Use +/- switch to toggle between 100, 25 M, 50 M.

#### WINDOW

The MMD window determines when the next mark can be detected. The cable must travel at least the distance of the

mark spacing (100', 50m or 25m) – the window setting, before a mark can be detected. Marks can only be detected if they occur within this window. If the window is set for 5' and the mark spacing is 100', the cable must travel no less than 95' and no more than 105' from the last mark before a new mark can be detected.

The MMD Depth display will blink when the depth is within the mark Window.

The Window is disabled after the MMD Reset button is pressed and will not be enabled until the first mark is detected.

Procedure: Use +/- switch to change MMD window value.

Indication: MMD will be displayed on the DEPTH display and the window value will be displayed on the TENSION display as it is being set. Pressing the MMD reset button clears the last mark setting.

## MMD LOG

The depth of the first 25 detected marks is stored in memory and can be displayed.

Procedure: Use +/- switch to toggle through all of the marks that have been detected. This starts from the last mark detected. Pressing depth 0 will clear all the stored marks.

Indication: MMD DP will be displayed on the DEPTH display and the mark depth will be displayed on the TENSION display.



### **3.8 ENCODER SELECT**

This function allows the user to change encoders by selecting a different encoder connected to the panel.

Procedure: Use +/- switch to select which encoder input on the rear panel will be used.

Indication: ENCSEL will be displayed on the DEPTH display and the encoder selected appears on the Depth display.

- ENC 1
- ENC 2
- BOTH

If BOTH is selected, the depth will be a composite of ENC 1 or 2. The two encoders are compared 10 times per second and the encoder that moves the furthest at each comparison will be used to increment the composite depth.

Note: Encoder 1 will always turn the opposite direction from encoder 2. In direct mode (see section 3.11), the encoder output will be in the same direction as encoder 1.

### **3.9 ENCODER PULSES PER REVOLUTION**

The value selected will automatically be used as the encoder input pulses per revolution (PPR) setting.

Procedure: Use +/- switch to set the ENCODER Pulse Per Revolution setting.

Indication: ENCDOR will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set. Default value is 1200.

### **3.10 ENCODER DIRECTION**

The value selected will toggle the encoder direction between UP and Down.

Procedure: Use +/- switch to set the ENCODER direction setting.

Indication: ENCDIR will be displayed on the DEPTH display and either UP or DN value will be displayed on the TENSION display. Default value is UP.

### **3.11 ENCODER OUT – SYSTEM PULSES PER FOOT**

This setting determines the encoder pulse rate that will be output to the acquisition system.

Procedure: Use +/- switch to set the encoder output value.

Indication: SYSPPF will be displayed on the DEPTH display and the value will be displayed on the TENSION display as it is being set.

### **3.12 DEPTH UNITS**

The depth values will be displayed in the units selected.

Procedure: Use +/- switch to set the DEPTH UNITS setting.

Indication: DEPTH will be displayed on the DEPTH display. The selection can be toggled between FEET or METERS. The selection will be displayed on the TENSION display. The ENGLISH (green) LED display will be lit when FEET is selected and the METRIC (red) LED will be lit when METERS is selected.

### **3.13 TENSION UNITS**

The tension value will be displayed in the units selected.

Procedure: Use +/- switch to set the TENSION UNITS setting.

Indication: TENSION will be displayed on the DEPTH display. The selection can be toggled between POUNDS and KILOGM. The selection will be displayed on the TENSION display.

## **4.0 SYSTEM OPERATING INSTRUCTIONS**

- 4.1 Power up panel and verify it is working properly.
- 4.2 Verify the panel is configured to match the system (head type, system output, encoder, etc.)
- 4.3 Set up acquisition system:
- 4.4 Press T-Zero and verify that panel tension reads 0. Verify tension is recorded on acquisition system.
- 4.5 Set line size to match cable size installed in head (refer to section 3).
- 4.6 Set Tension Alarm value (refer to section 3).
- 4.7 Set depth adjust value (refer to section 3).
- 4.8 Install cable in measuring head and lay it slack on the ground.
- 4.9 Press T-Zero to zero the tension value.
- 4.10 Press T-Test and verify that panel tension reads 10000 lbs. Verify tension is being properly recorded on acquisition system.
- 4.11 Pull tool to depth 0 position. Press D-Zero and verify that panel depth reads 0. Set acquisition system depth to 0 at this time.

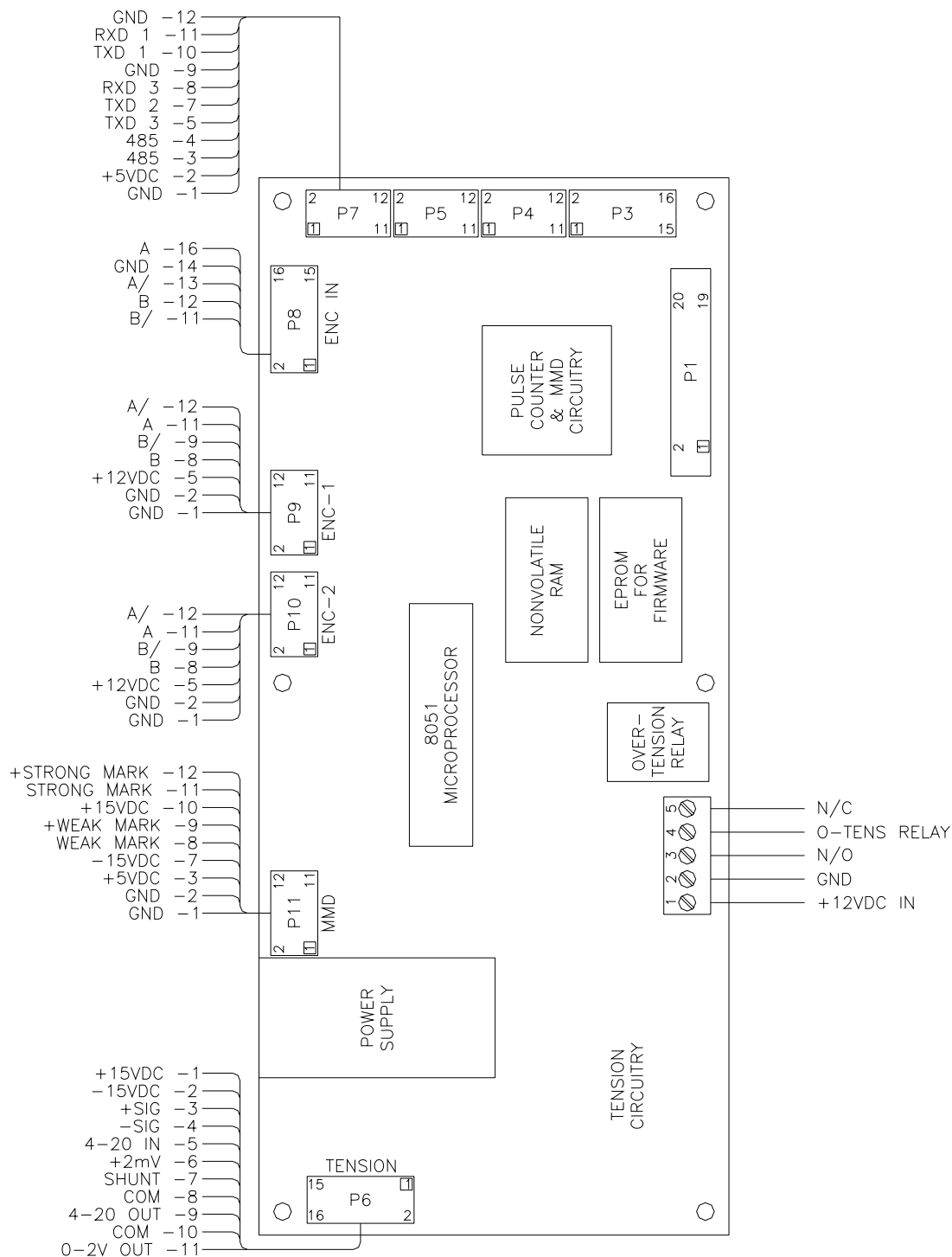
## 5.0 RECOMMENDED SPARE PARTS LIST

### AMS4A141 PANEL WINCH OPERATOR DISPLAY PANEL

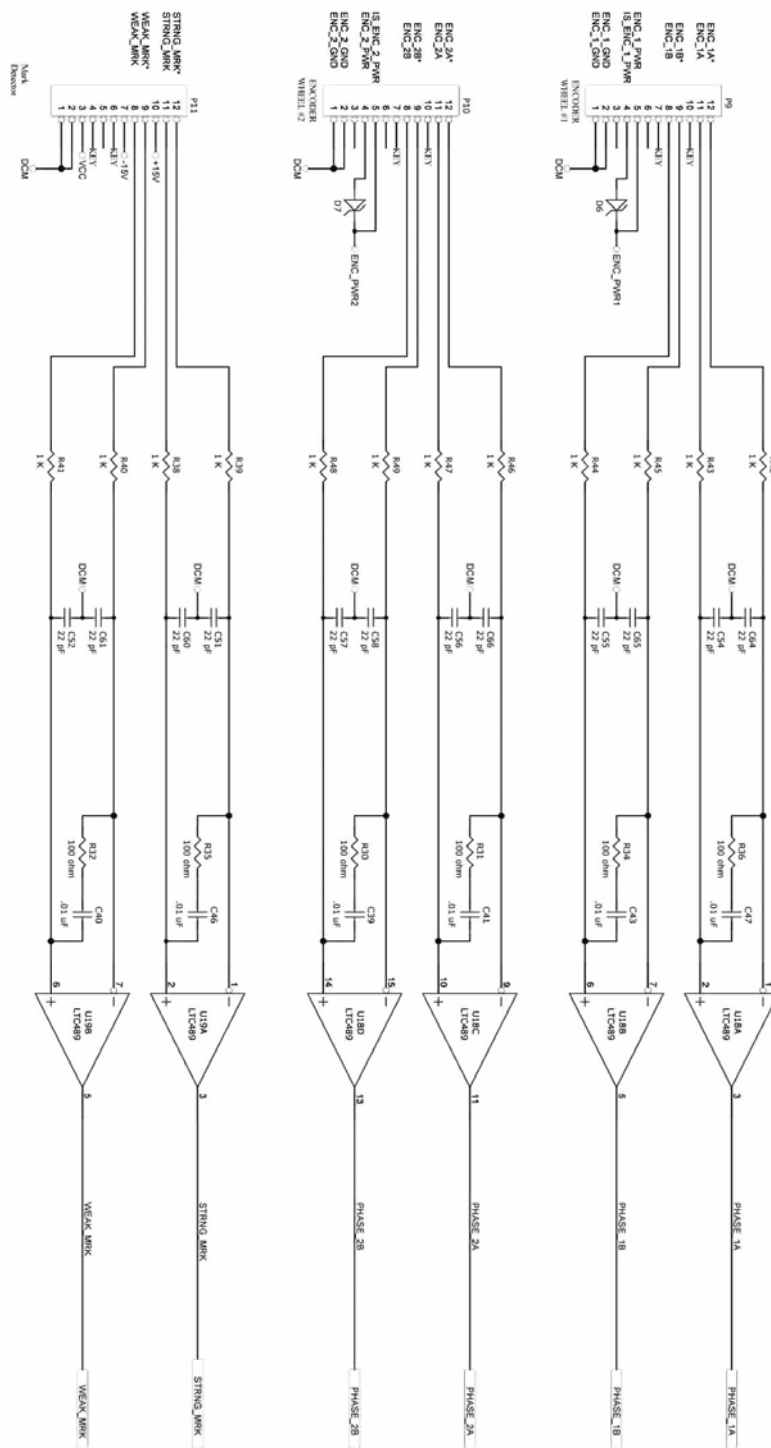
P/N	Description	Qty	Reference
AMS4P134E	PC BOARD AMS40 REV E	1	MOTHER BOARD
AMS4P110	METER ANALOG DIFF TENSION (+/- 1000 LBS)	1	M1
AMS4P128	DISPLAY LED .5" SERIAL 2"X3.5"	4	D1 – D4
ACMU1P06	LED RED DIALIGHT 5V	1	APPROACHING SURF
ACMU1P11	SONALERT #SC628D MALLORY	1	ALARM
AMS4P020	SWITCH MTL-106D ALCO LOCKING	2	POWER ON/OFF
AMS4P018	SWITCH MPA-106F ALCO PUSH MOM	5	MENU,T-ZERO,T-TEST,D-ZERO,METER RESET
AMS4P044	SWITCH TOGGLE DPDT MOM OFF MOM	1	+ / -
AMS4P021	SWITCH CAPS ALCO C-22 BLACK	3	T-ZERO,D-ZERO,METER RESET
AMS7P017	SWITCH CAP ALCO C-22 RED	1	D-ZERO, MENU
ACMU3P01	CONN MS3102E-14S-9P RECEPT	1	POWER IN
ACMU3P02	CONN MS3102E-14S-9S RECEPT	1	OVER TENSION OUT
AMS4P037	CONN MS3102E-16S-1P 7 PIN RCP	1	ENCODER OUT
AMS7P013	CONN MS3102E-18-9P LOAD CELL	1	LOAD PIN IN
AMS4P170	CONN KPSE02E12-10P RECEPTACLE	1	J5 - MMD
AMS4P038	CONN MS3102E-16S-1S 7 SOC RCP	2	ENCODER1,2 IN
AMS4P041	SWITCH PUSHBUTTON LIGHTED SPST	1	APPROACHING SURF
AMS4P042	LENS RED C&K SWITCH	1	RED LENS
AMS4P043	LED RED FOR C&K PUSHBUTTON SW	1	RED LED

## 6.0 DRAWINGS AND WIRE LISTS

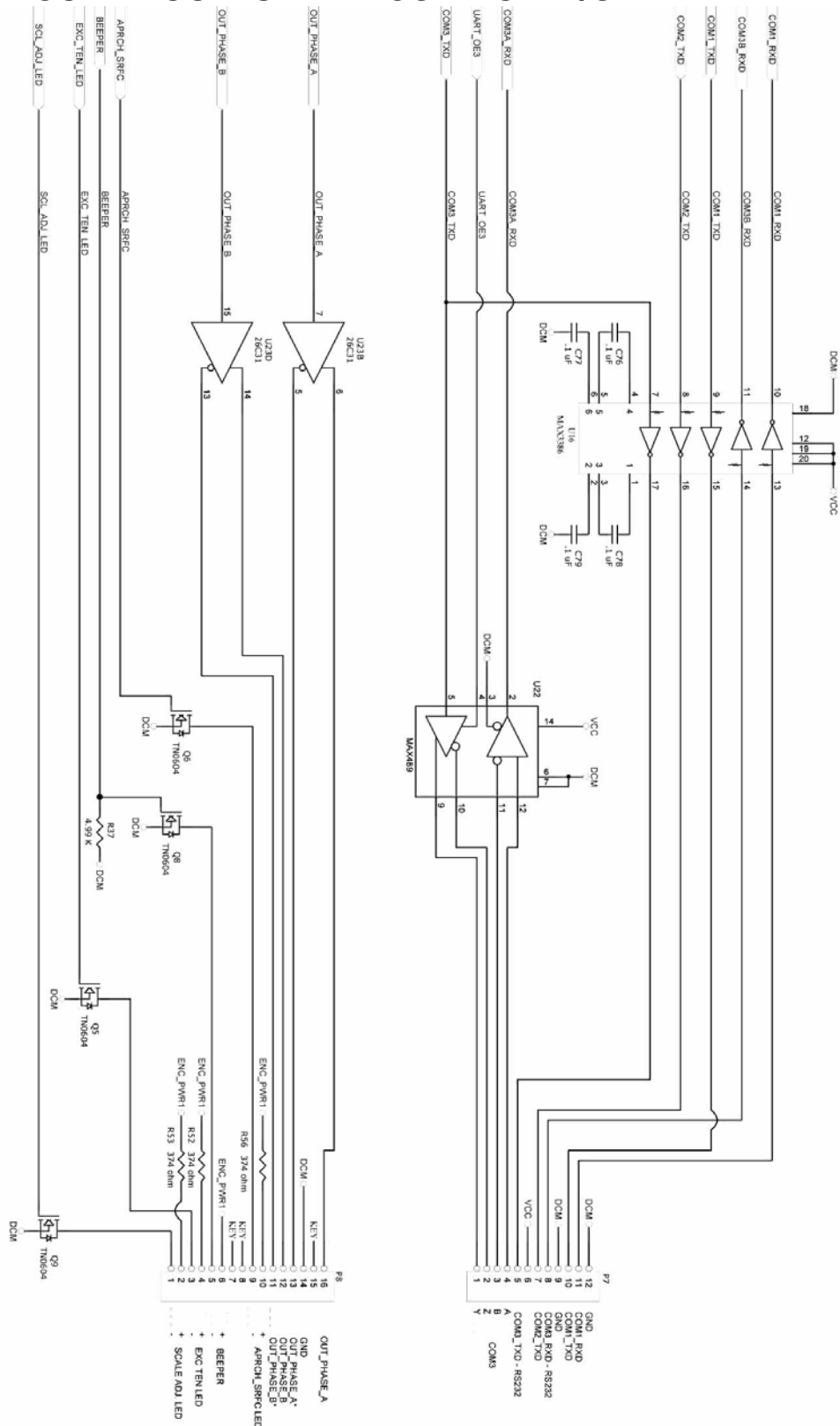
### 6.1 Main Processor Board



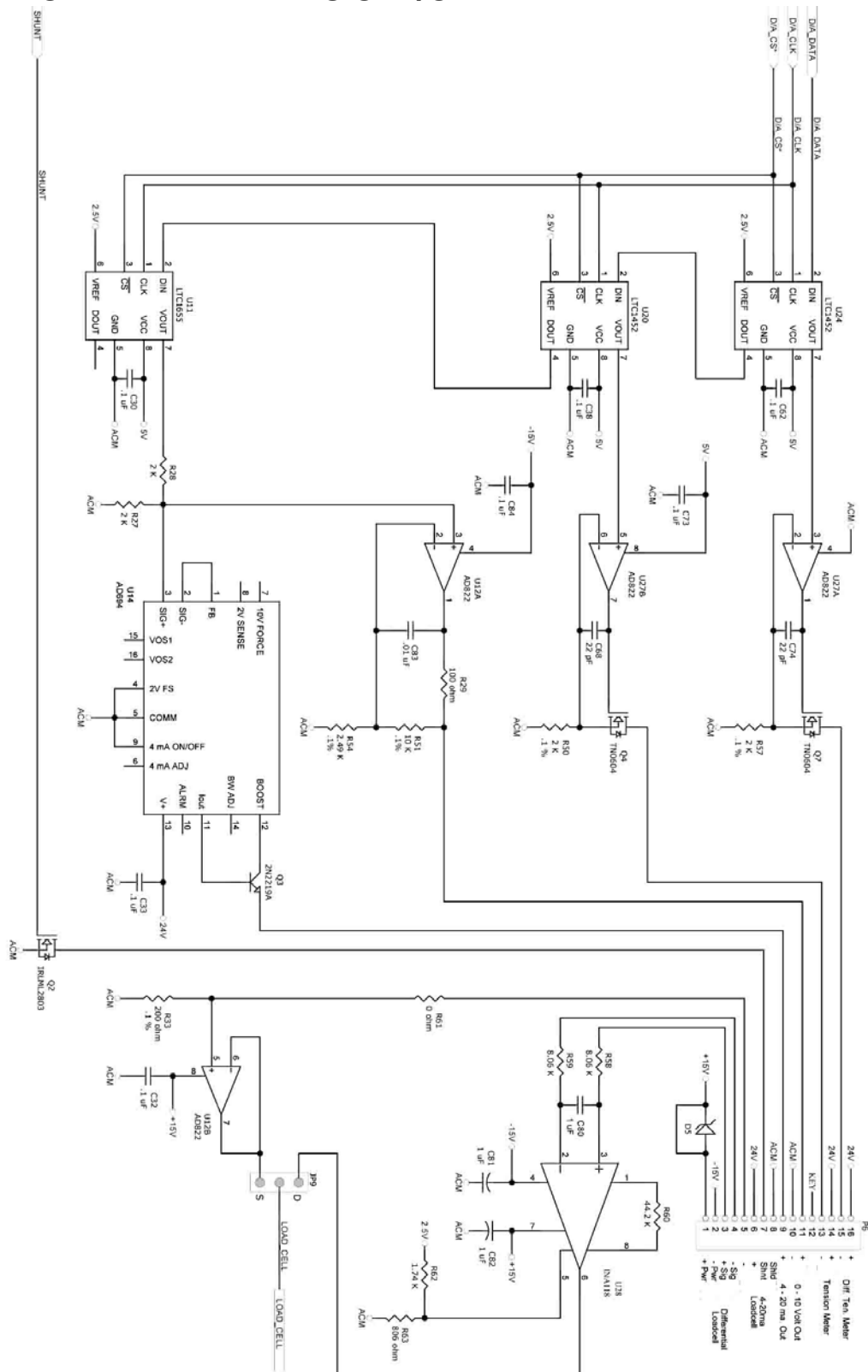
## 6.1.1 ENCODER AND MMD INPUTS



## 6.1.2 ENCODER OUTPUT AND COM PORT I/O

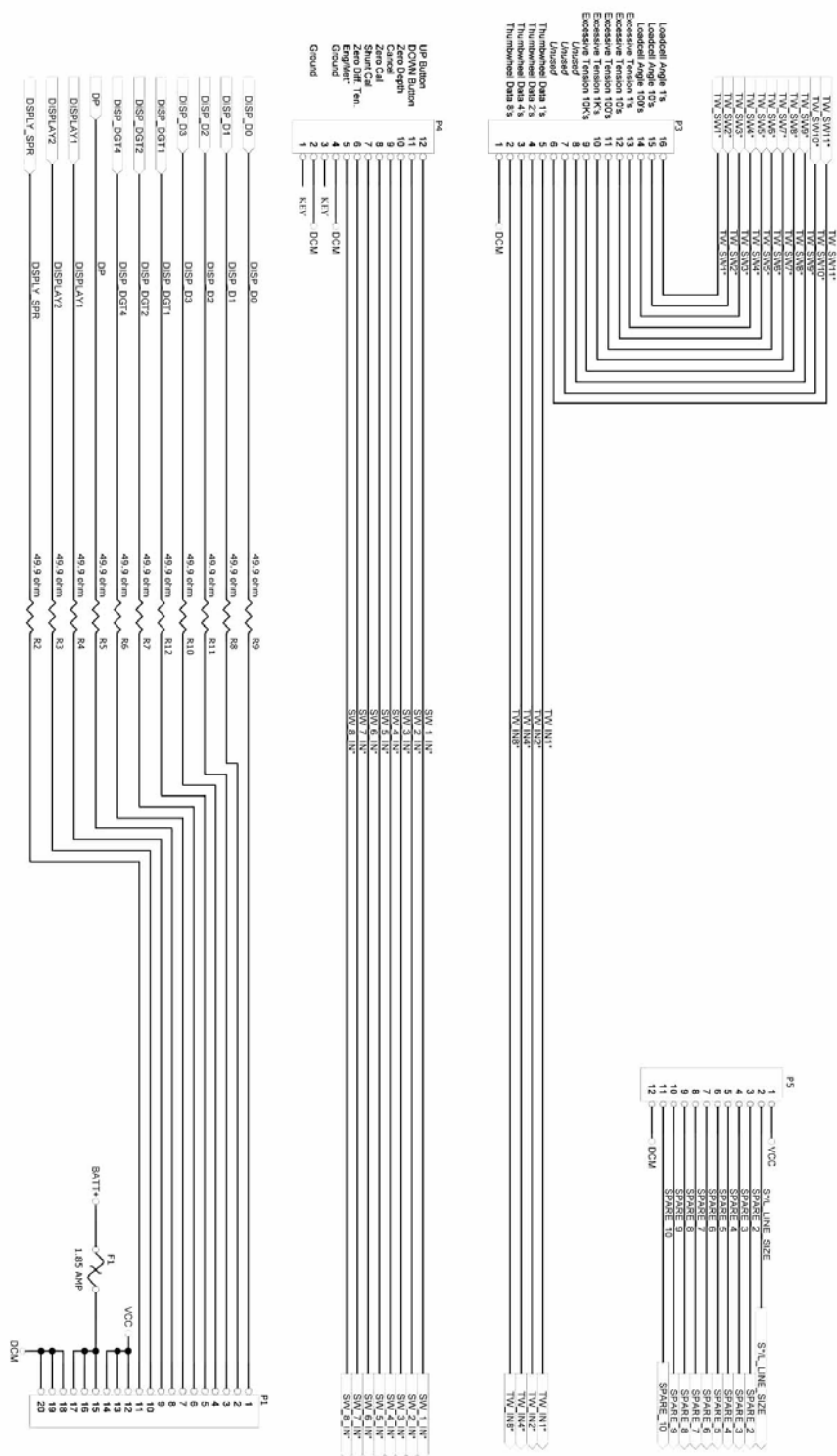


## 6.1.3 LOAD PIN AND TENSION I/O

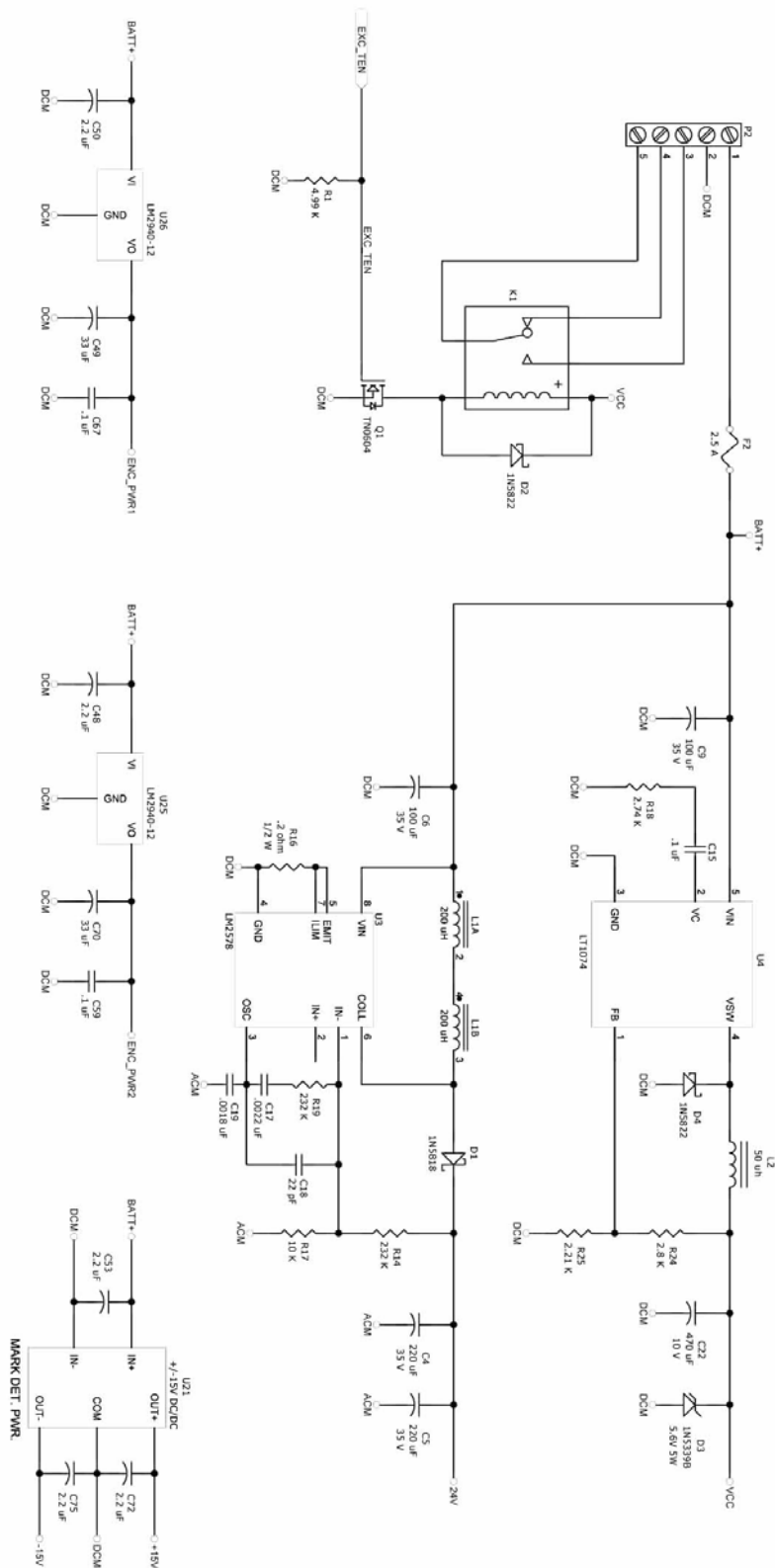




## 6.1.4 JUMPERS – BUTTONS



## 6.1.5 POWER SUPPLIES



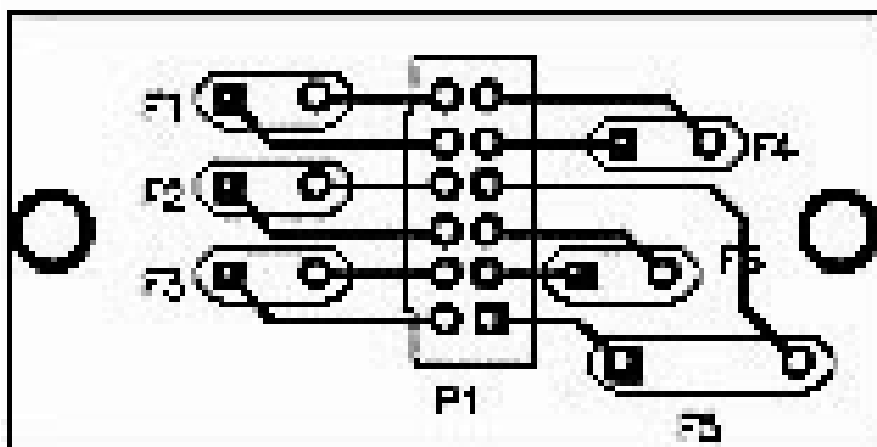
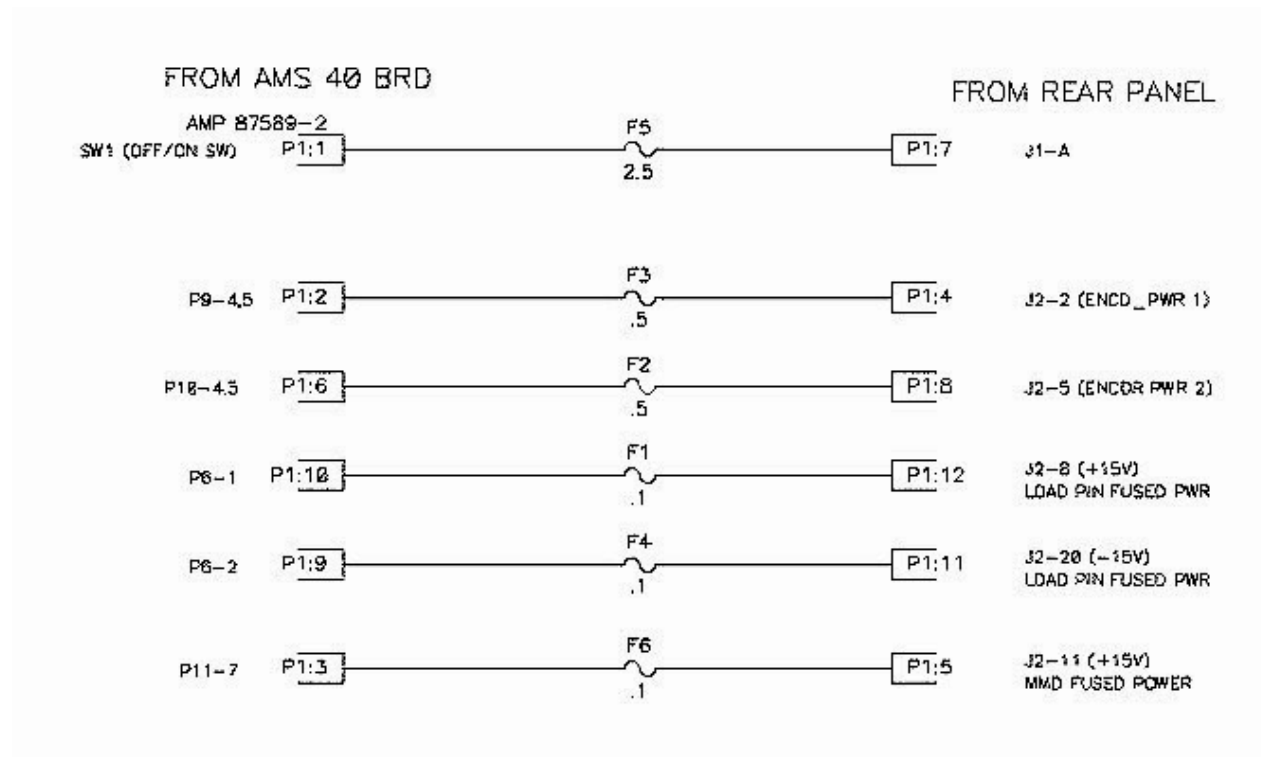
## 6.2 BACK PANEL CONNECTOR PINOUT

POWER IN A	12 - 24 VDC IN
POWER IN B	12 - 24 VDC GROUND
ENC 1 A	ENCODER QUADRATURE IN PHASE A
ENC 1 B	ENCODER QUADRATURE IN PHASE B
ENC 1 C	ENCODER QUADRATURE IN PHASE B*
ENC 1 D	ENCODER POWER - +5 VDC
ENC 1 E	ENCODER QUADRATURE IN PHASE A*
ENC 1 F	ENCODER IN GROUND
ENC 2 A	ENCODER QUADRATURE IN PHASE A
ENC 2 B	ENCODER QUADRATURE IN PHASE B
ENC 2 C	ENCODER QUADRATURE IN PHASE B*
ENC 2 D	ENCODER POWER - +5 VDC
ENC 2 E	ENCODER QUADRATURE IN PHASE A*
ENC 2 F	ENCODER IN GROUND
ENC OUT A	ENCODER QUADRATURE OUT - PHASE A
ENC OUT B	ENCODER QUADRATURE OUT - PHASE B
ENC OUT C	ENCODER QUADRATURE OUT - PHASE B*
ENC OUT E	ENCODER QUADRATURE OUT - PHASE A*
ENC OUT F	ENCODER OUT GROUND
O-TEN A	TENSION CONTACT RELAY COMMON
O-TEN B	TENSION CONTACT RELAY N.O.
LOAD PIN B	+15 VDC LOAD PIN POWER
LOAD PIN C	-15 VDC LOAD PIN POWER
LOAD PIN D	GROUND
LOAD PIN E	LOAD PIN SIGNAL+
LOAD PIN F	LOAD PIN SIGNAL-
LOAD PIN G	SHUNT CAL

MMD/CCL - C	MARK+
MMD/CCL - D	MARK-
MMD/CCL - E	MMD POWER +
MMD/CCL - F	COMMON
MMD/CCL - G	CCL +
MMD/CCL - B	CCL -
RS232 2	SERIAL PORT TRANSMIT
RS232 3	SERIAL PORT RECEIVE
RS232 5	SERIAL PORT GND
TEN OUT B	0 - 10V TENSION OUTPUT SIGNAL
TEN OUT C	TENSION OUTPUT SIGNAL GROUND
TEN OUT D	4 - 20 MA TENSION OUTPUT SIGNAL

## 6.3 FUSE BOARD AND POWER WIRING

Refer to 5.2 for wirelist



## 6.4 DIGITAL DISPLAY SETUP

The four digital displays can be set for address, baud rate, and brightness.

The button nearest the connector selects the parameter (address, baud rate, brightness).

The center button increments the parameter up

The end button increments the parameter down.

After the parameter is set, press the parameter button again to store it.

The addresses should be set as follows:

Line Tension = 1

Line Speed = 2

Depth = 3

MMD = 4

Set Baud Rate to 9600

Set Brightness to 15

## 6.5 RS232 SERIAL INTERFACE

The wiring is as follows:

DB9 PIN OUT: 2 = TRANSMIT, 3 = RECEIVE, 5 = GROUND

Run a program such as MS Windows HyperTerm using the following parameters

BAUD	38,400
BITS	8
PARITY	N
STOP	1

Press H or ? to display the help screen

\* \* \* AMS4A141 Help Screen \* \* \*

```
H,? - This screen.
D - Display units, direction, depth, speed, and tension.
L - Modify load cell angle (factor) Usage: L1.2
P - Modify encoder pulses/revolution. Usage: P600
V - Verify WDDU setup status.
W - Modify wheel size (line other) (feet) Usage: W4.0
Z - Preset depth.Usage: Z0.0 | _ | --> New depth.
U - Modify units of measure UE or UM
A - Depth Alarm. Usage: A100 | _ | --> Depth Alarm.
N - Line Size N0 7/32; N1 9/32; N2 5/16; N3 3/8;N4 7/16;
  N5 15/32; N6 15/32HT; N7 SLAM N8 SLAMHT; N9 SSLAM
M - Tension Alarm. Usage: 'M2500' for 2500 pound alarm.
```

J - Depth Adjust. Usage: 'J-1' for -1 ft per 1000 feet  
S - System PPF Usage: 'S125' for 125 PPFoot to system  
B - Enter Mud Weight B12.3 lbs/gal  
T - Enter Tool Weight T1000 lbs  
k - Toggle stretch correction on/off  
p - Display depth and stretch data  
m - Use MMK Correction

Press V to display the Verification Screen

\* \* \* AMS4A141 Setup Status \* \* \*

Software revision	S4100.01
Line Size =	slam
Depth Units =	Feet
Depth Units =	Pounds
Depth alarm =	100 ft
Tension alarm =	2400 lbs
Tension shutdown =	3500 lbs
Encoder PPR =	1200
Depth Adjust =	0.0
Wheel Circumference =	2.000 feet
Load Cell Angle Factor =	1.00
System Pulse per Foot =	600.0
Cable volume =	2118 cubic inches per 1000 feet
Cable weight =	1.0
Weight fluid =	8.300
Cable weight fluid =	1.000
Tool weight =	1000
Stretch Corr is	OFF
MMK correction is	OFF
Line stretch tool =	8.3

Press D to display the Data Screen

DATA STRING DESCRIPTION  
12345678901234567890123456  
U D Zddddd.d ssss.s tttttt<CR><LF>

WHERE:

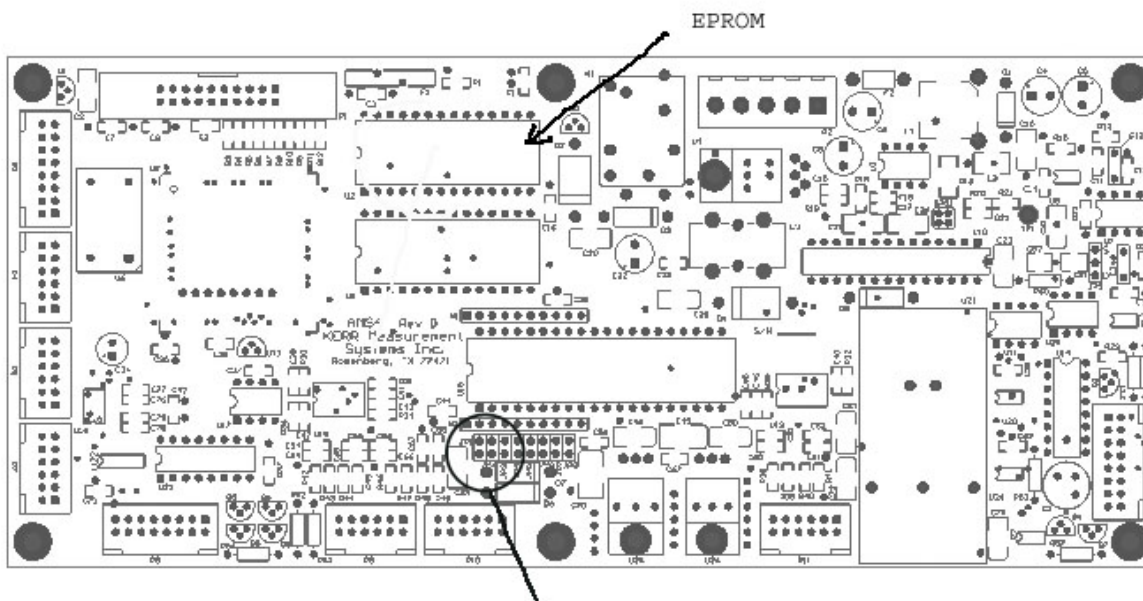
U - UNITS (Depth, Tension)  
    'E' - English, English, 'G' - English, Metric,  
    'M' - Metric, Metric, 'F' - Metric, English  
D - DIRECTION ('U' - UP; 'D' - DOWN; 'S' - STOPPED)  
Z - ZERO DEPTH REF. ('+' BELOW GROUND; '-' ABOVE GROUND)  
d - DEPTH  
s - LINE SPEED  
t - TENSION  
<CR> - CARRIAGE RETURN, <LF> - LINEFEED

## INSTALLING NEW SOFTWARE

### 7.1 SOFTWARE MODIFICATION BY REPLACING THE EPROM

The software that controls this panel is stored in an EPROM Integrated Circuit located at U2 (see drawing on next page). To upgrade the software to a new version, simply remove the eeprom I.C. and install a new eeprom I.C. (be careful not to bend the legs during installation).

After new software is installed, make sure and "reboot" the panel by turning off the panel, depressing the T-ZERO and T-TEST buttons simultaneously then turn the power back on while the buttons are depressed.



**J1 = DEPTH UNITS, ON = METERS, OFF = FEET**  
**J2 = TENSION UNITS, ON = KG, OFF = POUNDS**  
**J3 = HEAD TYPE, ON = AM3K, OFF = AM5K**



## **7.2 SOFTWARE MODIFICATION USING THE SERIAL PORT**

### **7.2.1 PREREQUISITES:**

1. The real-time data acquisition board must have a socket for the MicroController and a CPU piggy-back PCB installed in that socket with a DS98C450 MicroController installed.
2. A computer with a serial port, and installed Hyperterminal program.
3. The new revision real-time data acquisition HEX file program.

### **7.2.2 PROCEDURE:**

1. Transfer the new revision HEX file to a PC with a serial port or a USB to serial adapter.
2. Turn power on to the Hoistman's panel.
3. Connect your PC to the serial port at the rear of the panel.
4. Open a Hyperterminal session. Use the following settings:

Serial Port: COM1  
Baud Rate: 57600  
Data Bits: 8  
Parity: None  
Stop Bits: 1  
Flow Control: None

5. Set the switches on the CPU PCB to PROGRAM mode as follows:

1 - AWAY FROM CPU  
2 - AWAY FROM CPU  
3 - TOWARD CPU

6. Open the Hyperterminal connection and then press the keyboard ENTER key. The MicroController ROM Loader will respond with a banner and then a '>' prompt.
7. Type an uppercase 'K' and the ROM Loader will Klean-erase the Flash.
8. Type an uppercase 'L' and the ROM Loader will wait to Load a HEX file.



36220 FM 1093  
P.O. Box 850  
Simonton, Texas 77476  
Phone: 281.346.4300  
Fax: 281.346.4301  
[benchmarkwireline.com](http://benchmarkwireline.com)

10. The ROM Loader will begin programming the Flash and will report a GOOD status for the duration of the programming procedure as follows:

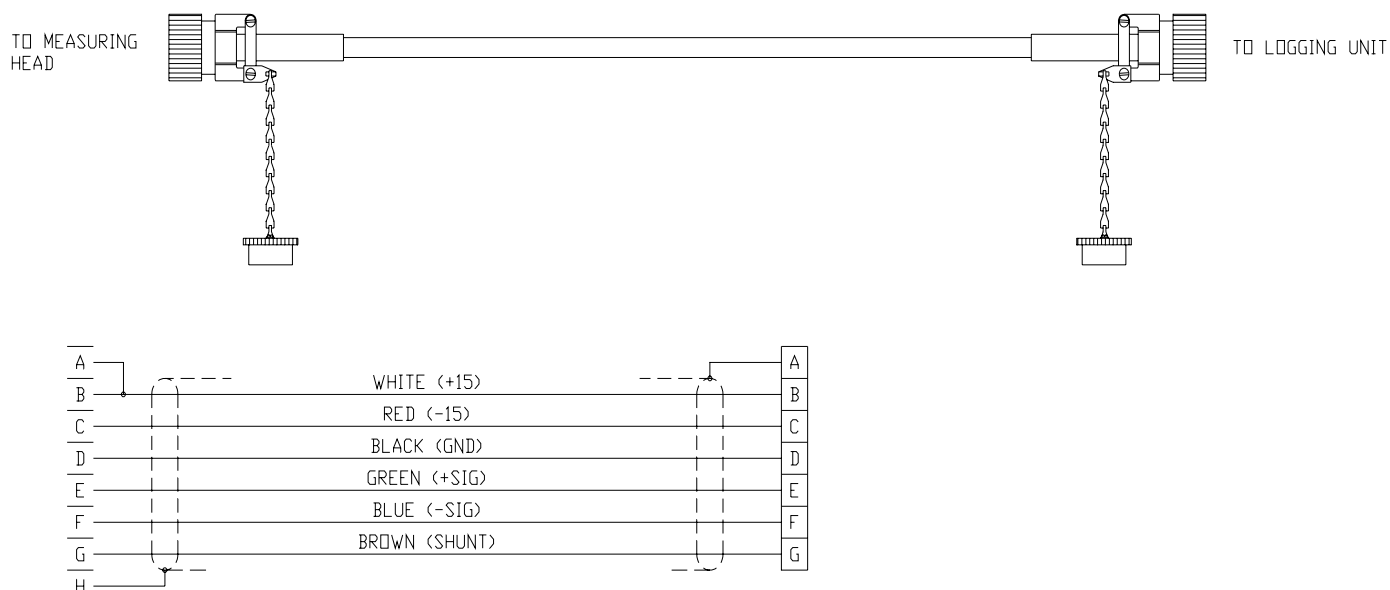
[illegible]

- 1 - TOWARD CPU
- 2 - TOWARD CPU
- 3 - AWAY FROM CPU

1 - TOWARD CPU  
2 - TOWARD CPU  
3 - TOWARD CPU

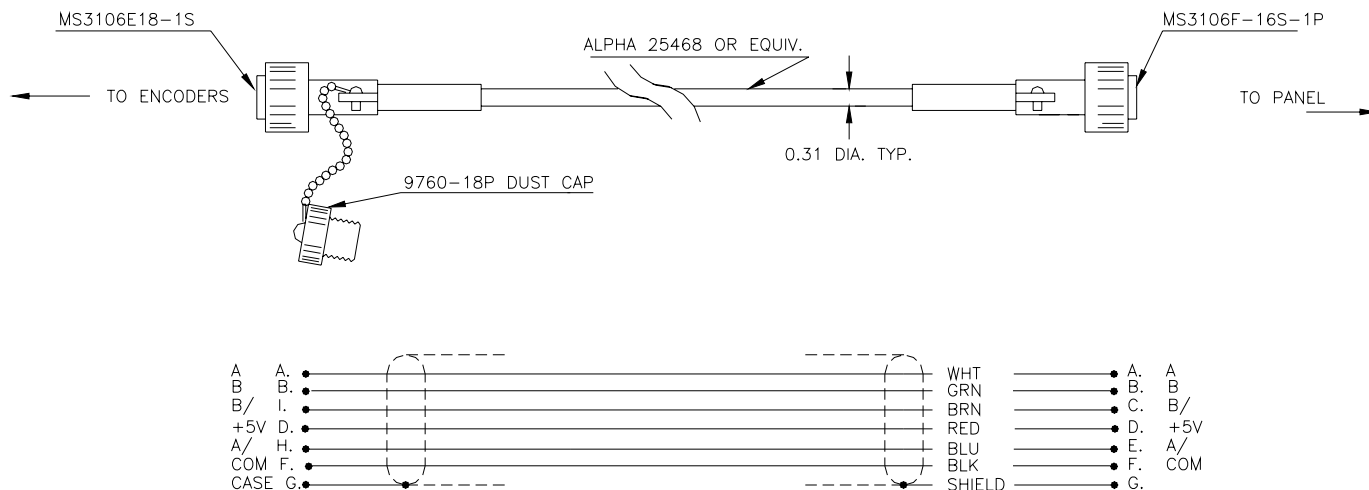
## 8.0 CABLE DIAGRAMS

### 8.1 AMS8A024 CABLE ASSEMBLY – TENSION FROM MEASURING HEAD TO PANEL



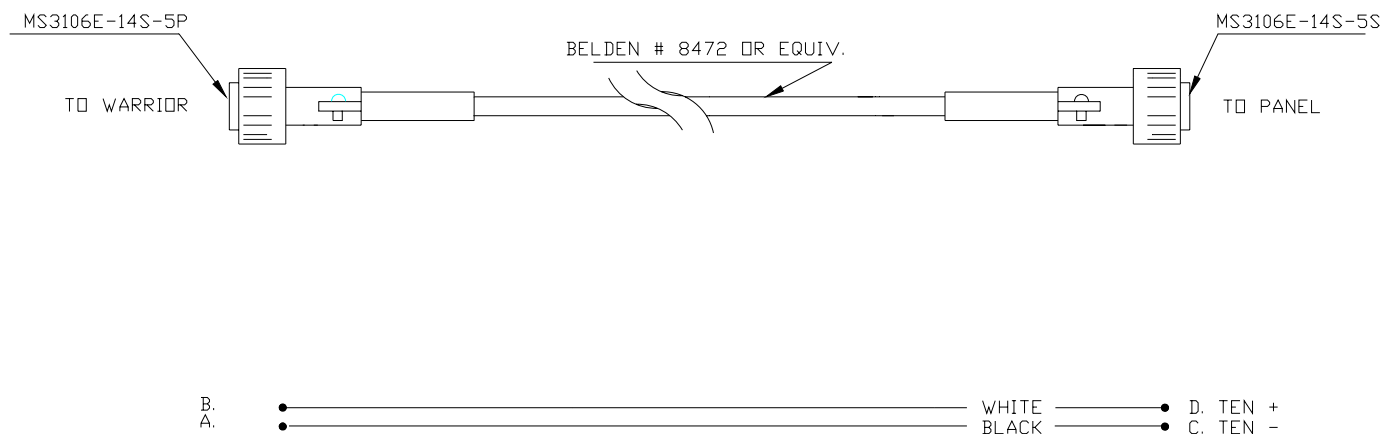
P/N	Description	Qty	Ref
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	20	FT
AMS8P057	CONN KPT06A16-8S STR PLUG, LOAD PIN END	1	EA
AMS7P014	CONN MS3106E-18-9S LOAD PIN, PANEL END	1	EA
AMS8P059	CLAMP CONN MS3057-10A W/BUSH	1	EA
AMS8P060	DUST CAP CANNON SHELL SIZE 16	1	EA
AMS1P029	DUST CAP MS25042	1	EA

## 8.2 AMS4A105 CABLE ASSEMBLY - ENCODER FROM MEASURING HEAD TO PANEL



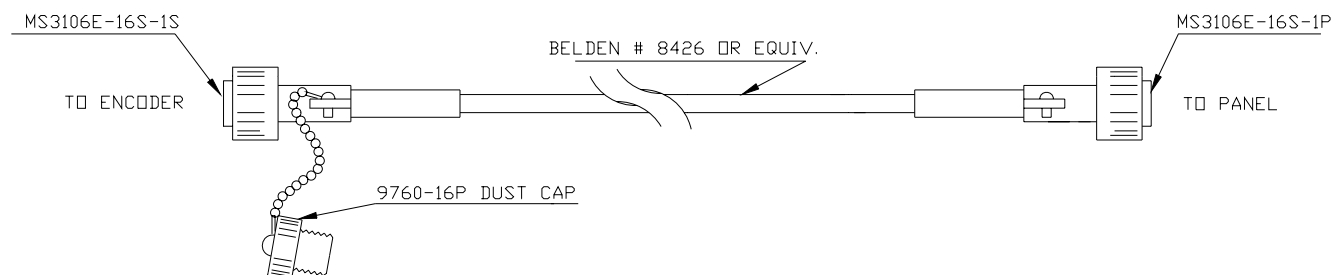
P/N	Description	Qty	Ref
AMS1P028	CONN MS3106F-18-1S ENCODER END	1	EA
AMS4P183	CONN MS3106F-16S-1P PANEL END	1	EA
AMS4P221	CABLE 20/8C ALPHA 25468 BLACK	20	FT
AMS7P040	DUST CAP AMPHENOL 97-60-18	1	EA

### 8.3 AMS4A111 CABLE ASSEMBLY – TENSION FROM PANEL TO WARRIOR



P/N	Description	Qty	Ref
AMS4P186	CONN MS3106E-14-5	1	EA
AMS4P185	CONN MS3106E-14-5P	1	EA
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	10	FT
AMS7P064	BUSHING #9779-513-8 AMPHENOL	2	EA

## 8.4 AMS4A107 – CABLE ASSY ENCODER FROM PANEL TO WARRIOR



MS3106E-16S-1S

A A.  
 B B.  
 +5V D.  
 COM F.  
 CASE G.

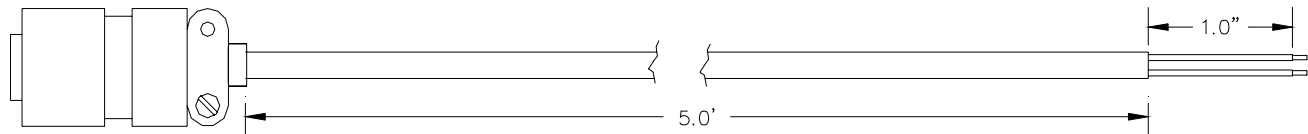
BROWN  
 WHITE  
 GREEN  
 BLACK  
 RED

MS3106E-16S-1P

A. PHASE A  
 B. PHASE B  
 D. D POWER  
 F. COMMON  
 G. CASE

P/N	Description	Qty	Ref
AMS4P184	CONN MS3106E-16S-1S	1	EA
AMS4P183	CONN MS3106E-16S-1P	1	EA
AMS7P059	CABLE 20/6 BELDEN 8426	20	FT
AM5KP113	DUST CAP MS25042-16DA	1	EA
AMS7P064	BUSHING #9779-513-8 AMPHENOL	2	EA

## 8.5 AMS7A022 CABLE ASSEMBLY – DC POWER IN



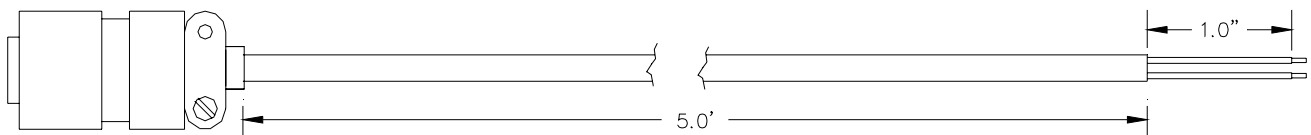
A – WHITE  
 B – BLACK

A = +

B = -

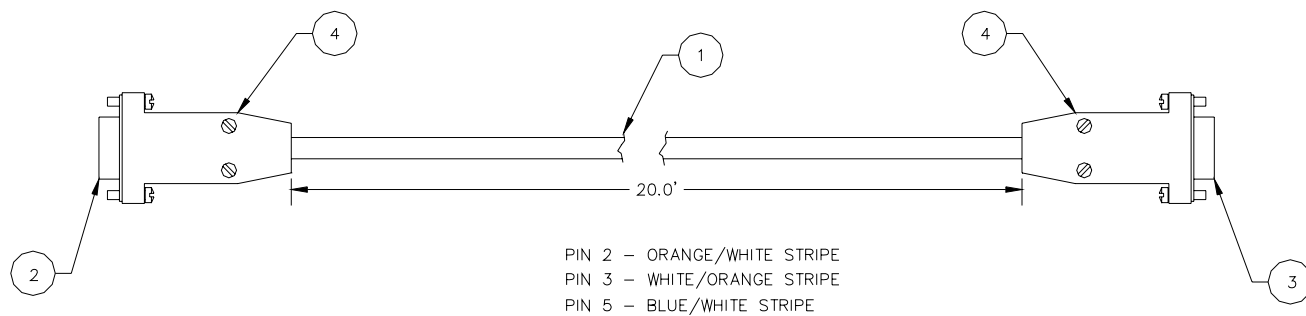
P/N	Description	Qty	Ref
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	5	FT
AMS7P044	CONN MS3106E-14S-9S	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA

## 8.6 AMS7A023 CABLE ASSEMBLY – OT SHUTDOWN



P/N	Description	Qty	Ref
AMS7P061	CABLE 16-2 SJ CORD BELDEN 8472	5	FT
AMS7P045	CONN MS3106E-14S-9P	1	EA
AMS7P063	BUSHING #9779-513-6 AMPHENOL	1	EA

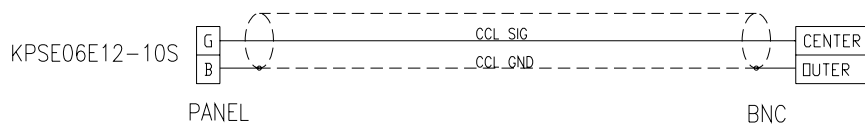
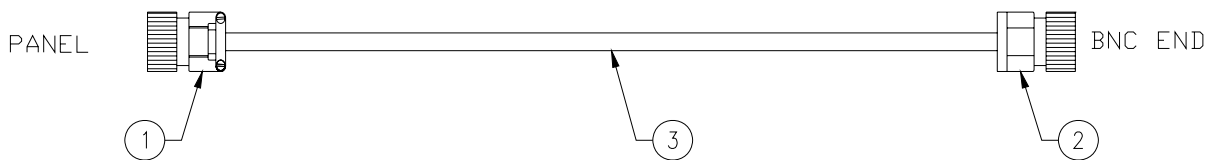
## 8.7 AMS7A024 CABLE ASSEMBLY – RS232



P/N	Description	Qty Ref	
AMS7P062	CABLE 24/2P STNDED PE/PVC	20	FT
AMS7P016	CONN DE-9P	1	EA
AMS7P015	CONN DE-9S	1	EA
AMS7P067	CONNECTOR AMP CABLE CLAMP	2	EA

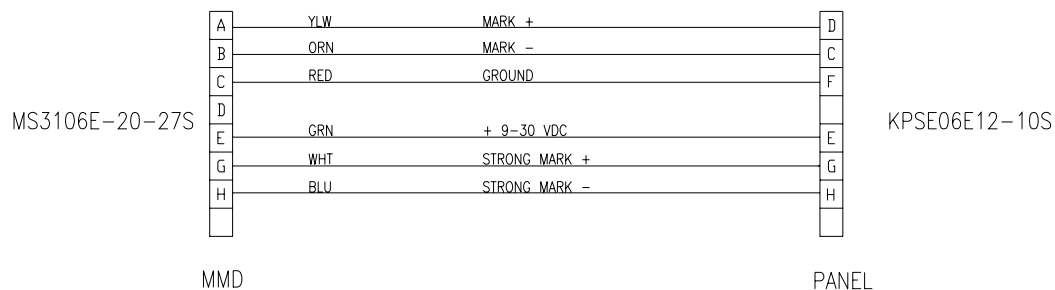
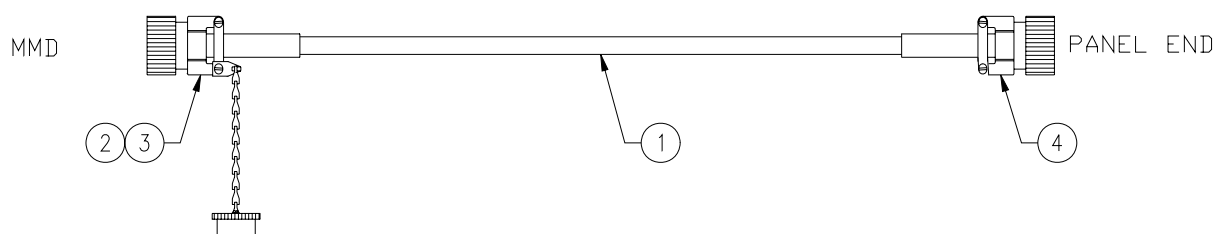


## 8.8 CCL CABLE AMS4A137



P/N	Description	Qty	Ref
AMS4P179	CABLE COAX BELDEN 8259	15	FT
AMS4P180	CONN KPSE06J12-10S STR PLUG	1	EA
ALS1P030	CONN BNC PLUG	1	EA

## 8.9 MARK DETECTOR CABLE AMS4A109 (required only for magnetic marks)



P/N	Description	Qty	Ref
ACMU2P21	CONN MS3106E-20-27S	1	EA
AMS4P180	CONN KPSE06J12-10S	1	EA
AM5KP093	CABLE 20/8	20	FT
ACMU2P24	DUST CAP 25042-20DA	1	EA